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SUBJECT: Joint NASA/NAA Configuration Control Board ECP Action on CSM Block II CDR RID's - Downey, California, February 3, 1966 - Case 330

DATE: February 15, 1966

FROM: J. J. O'Connor
T. L. Powers

MEMORANDUM FOR FILE

The Configuration Control Board (CCB), with J. F. Shea of MSC and D. D. Myers of NAA as co-chairmen, met at NAA to act on the 42 Engineering Change Proposals (ECP) generated by NAA to satisfy the Review Item Disposition (RID) forms from the CSM Block II Critical Design Review (CDR). This CCB review was meant to be the final activity of the CDR. All of the RID's are now "disposed" of, at least in the sense that dates have been established for new inputs or for completion of studies. This includes many of the continuing and unresolved problems including consumable budgets, thermal control and GSE.

Table I lists the 42 items with the RID and ECP numbers. In order to generate this large number of ECP's, NAA used somewhat simplified ground rules, but the estimates of cost and schedule impact were accepted as accurate. The expeditious handling of the many CCB items indicated previous coordination between NAA and MSC, with a few exceptions (items 3, 6). Several of the problems (items 2, 8, 32) seem to be of a long-term nature which could have been solved or avoided if there had been better technical interchange. The problem of the dual bridgewire initiation (item 42) was first uncovered at DEI 009 and 011 but was not completely resolved then. A few RID's were disposed of without solving the problem (items 13, 33). Some of the test failures were attributed to the use of prototype or non-production items. This has been a problem in the zero-g tests (item 38). It was also mentioned in connection with an ECS vent valve failure (item 21), but it was not clear that the cause of the failure was related to the non-production configuration. There was a strong effort to reduce cost and/or schedule impact by delaying the effectivity of the changes from 2TV-1 to SC 101; this raises questions about the configuration similarity of these vehicles.

J. J. O'Connor

T. L. Powers

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Attachment
Table I

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(see next page)

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TABLE I

CCB Action on CSM Block II RID's

Summary

16 Accepted with NAA concurrence
3 Approved without NAA concurrence
7 Withdrawn by MSC
7 Disapproved
5 To be re-submitted
7 NAA Action Items
3 Unresolved problems

Number	CCB Action	Title and Comments
Item 1	Accepted	Submit Subsystem CDR schedule NAA has schedule to give to MSC. A copy should be available later.
Item 2 RID I-1-17 ECP 0078	Disapproved	Remove Inhibition of Manual Translation Commands Manual translation commands which are available in minimum impulse and rate modes should be available in acceleration mode but cost (650K) and schedule (12 weeks) preclude change now.
Item 3 RID I-4-2 ECP 0095	Problem	Additions to Operational Instrument List NAA has implemented measurement list (T/M, instrumentation and ACE) without MSC buy-off. NAA and MSC are to work off discrepancies for minimum impact.
Item 4 RID I-4-5 ECP 0104	Withdrawn NAA Action	Delete Three SLO's from PMP Removal of three oscillators would save 108K but would require requalification of package for vibration and would introduce other problems to the point that the RID per se was withdrawn. However, NAA was asked to re-examine a simple fix (mass replacement) to allow cost saving.
Item 5 RID I-4-7 ECP 0105	Withdrawn	Make CSM TV cables Common to LEM Cables The impact would be too great.

Number	CCB Action	Title and Comments
Item 6 RID I-4-4 ECP 0092	Re-submit	Provide Automatic High-Gain Antenna Reacquisition The 627K NAA estimate was considered too high. All that is needed is an astronaut-assist related to BBQ-spin. NAA will submit a simplified version which will probably have little impact.
Item 7 RID I-4-12	NAA Action	Specify 28° rms Phase Jitter in Communications System Equipment presently exceeds this requirement but NAA wants to complete its analysis before entering the value in the specification. (This RID may cause confusion; although the component can satisfy the 28° requirement, the overall system may not be satisfactory.)
Item 8 RID I-4-33 ECP 0109	Re-submit	Simplify PLSS Pre-egress Checkout Connector Present procedure of connecting/disconnecting coax is unacceptable and in violation of an existing ICD. Proposed fix using a "signal sampler" box was rejected. NAA should re-submit ECP to use an existing VHF multiplexer connection.
Item 9 RID I-4-31 ECP 0115	Disapproved	Add switch for PMP Power Supply Switching Present connections give single-path redundancy instead of quad redundancy but cost (122K) and schedule (10 weeks) preclude a change now.
Item 10 RID I-4-15 ECP 0107	Re-submit	RCS/SCS/EPS Wiring Change Failure of either DC bus removes RCS engine automatic coil. ECP showing 8 wk impact should be re-submitted to show zero wks by having a SC 101 effectivity.
Item 11 RID I-5-34 ECP 0017 ECP 0056	Accepted NAA Action	Boost Protective Cover CM/SM Umbilical Cut-out MSC approved NAA design of cut-out but wanted a flight test to examine flutter. Instead NAA is to submit analysis and test plan by March 1.
Item 12 RID I-5-131 ECP 0096	Re-submit	Provide SM RCS Manual Heat Control Heater has two elements with one being used for automatic control; wiring and switches should be added for a manual back-up. ECP is to be re-submitted for no impact on SC 101.

Number	CCB Action	Title and Comments
Item 13 RID I-5-97 ECP 0113	"Accepted"	Crew Couch Struts Capability Study Analysis shows a wind limit of 15 knots for land landing on pad abort; launch capability is 24 knots. A more realistic land model would help, etc. RID was considered fulfilled by generation of the 15 knot number; MSC will review the problem.
Item 14 RID I-5-27 ECP 0114	Accepted	Redesign of Flashing Light Deployment Mechanism New design was acceptable with small impact; effectivity is to be determined.
Item 15 RID II-5-93 PCCP 690	Disapproved	Analyze Torsional Stiffness of CM/SM Interface This information would be useful for control system analysis in LEM-docked configuration but would cost 260K to generate sophisticated modal structural models.
Item 16 RID I-5-114	Disapproved	Elimmate SM Radial Beam Chemical Milling Lack of vendor process control leads to thin spots in beams and therefore poor reliability. A solution would be to increase final thickness by 3 mils at the expense of a 10 pound SM weight penalty, but it was decided that a review of a process was inappropriate for the CDR.
Item 17 RID II-5-6	Withdrawn	CM Secondary Structure (LES Connector Mount)
Item 18 RID II-5-10	Accepted	YY Impact Attenuation Strut Several small changes (addition of a decal to show direction and locked position, etc.) were accepted as in scope and will be done on Block I also.
Item 19 RID I-5-108	Withdrawn	X-X Strut Lockouts
Item 20 RID I-5-21	Withdrawn	Revise Upper Deck Mockup Many things should be demonstrated by mock-up for which EM^3 is not acceptable. Perhaps BP-6B will be satisfactory.

Number	CCB Action	Title and Comments
Item 21 RID I-5-13	Disapproved	Qualification Tests of Post Landing ECS Vent Valves One valve failed on SC 007 drop test. The NAA static valve test will insure zero post-impact leakage but does not specify allowable water ingestion during impact.
Item 22 RID II-5-9	Withdrawn	CM RCS Deactivation
Item 23 RID II-3-18 ECP 0090	Accepted	Correct the Index Markings on Optical Alignment Sights
Item 24 RID I-3-56 ECP 0094	Accepted	Supply Crew Couch "D" Ring Tool Astronaut can't reach "D" ring; tool to be supplied with no cost impact.
Item 25 RID I-3-20-ID RID II-3-6 ECP 0098	Accepted	Crew Couch Seat Back Angle There are several adjustments and positions which should be added to the couch; one is to increase the back angle from 60° to 96° at a cost of 30K per SC. The ECP was accepted for SC 101 effectivity but there should be complete mechanical and cost analysis. The Block I angle will be increased to 96° by a mod kit to be installed at the cape. These changes are to prevent astronaut - structure collision at impact.
Item 26 RID II-3-22 ECP 0100	Accepted	Eliminate TV Camera Mounting Bar The camera will have to be mounted elsewhere. Perhaps it can be put in the "rock box" for launch and disposed of before re-entry.
Item 27 RID II-3-51B ECP 0101	Approved	Add Mirror for Center Couch Mounting location to be determined during stowage mockup review; perhaps a Gemini mirror should be used.
Item 28 RID I-3-78 ECP 0106	Accepted	Add Redundant Switching Functions This will eliminate single point failures. Effectivity is for SC 101 instead of 2TV-1.

Number	CCB Action	Title and Comments
Item 29 RID II-3-67 ECP 0108	Accepted	Bio-Instrumentation Accessories Kit Stowage
Item 30 RID II-3-30 ECP 0110	Accepted	ECS Hose Restraining Strap Buckle
Item 31 RID I-3-64 ECP 0111	Accepted	ECS Suit Umbilical Restraint An elastic strap will be used.
Item 32 RID I-3-42 ECP 0119	NAA Action Problem	CO_2 Sensor Incompatibility NAA assumed GFE (Perkin-Elmer) sensor to be linear and designed Caution and Warning (C&W) module to respond to 1.25 volts to indicate 7.6 mm partial pressure. However, the sensor has an exponential output. The C&W indication would now occur at 5 mm which is within normal operating limits. NAA is to examine the availability of a 2.25 volt module. It would cost 200K to modify the sensor. Perhaps the voltage can be attenuated between the sensor and the module.
Item 33 RID I-3-30 ECP 0124	Disapproved	Add a Fecal Cannister Blower This ECP was rejected because of its cost impact, but no alternate solution was proposed.
Item 34 RID II-3-4A ECP 0125	Accepted	PGA Couch Interface This item involved a head-rest adjustment and was to be included with Item 25.
Item 35 RID II-3-63 ECP 0126	Accepted	Addition of Velcro NAA proposed field installation to avoid wear. It was accepted as an MCR. The hooks are on the structure and the pile on the movable equipment to be compatible with the LEM and the GSE.

Number	CCB Action	Title and Comments
Item 36 RID II-3-38 ECP 0123	Accepted	Added Stowage Requirements Accepted as a field installation
Item 37 RID I-3-27-2D PCCP 691	Disapproved	R. H. Equipment Bay Tool Container Only the open cell is critical and NAA is doing it.
Item 38 RID Series 11 PCCP 694	NAA Action	Use Production Equipment for Zero-G Tests ECP estimated 750K cost. NAA is to submit item list, determine scheduled availability and other uses of the hardware involved. The tests should be included in the CTN but NAA wants to examine impact on the incentives.
Item 39 RID Series 18 ECP 0016	Approved NAA Action	Block II ECS Thermal Control Circuit Changes This series involves many items such as use of the redundant loop, selective stagnation, suit compressor C&W sensor only on one compressor, etc. Effectivity for 2TV-1 would cost 7000K and 6 wks; ECP was accepted with zero cost and schedule impact for SC 102 effectivity. As a separate action item, NAA is to submit an analysis of the requirement for continuous circulation of water-glycol.
Item 40 RID II-3-64 ECP 0128	Re-submit	Add SM Debris Traps NAA is to respond by March 1 about adding netting to prevent tools from falling into inaccessible places.
Item 41	Withdrawn	Block I Implementation of Block II RID's It was felt that this had been covered under the separate items.
Item 42 RID I-5-128 ECP 0073	Approved NAA Action Problem	Eliminate CM RCS Dual Bridge Wire Initiation The RID was against an incorrect drawing which must be corrected but this does not solve the problems. The NAA action is to stop development of redundant oxidizer dump valves because of the 500K cost. A possible solution is to connect each bridge wire to a different bus with a time-delay device to preserve the isolation of the busses.